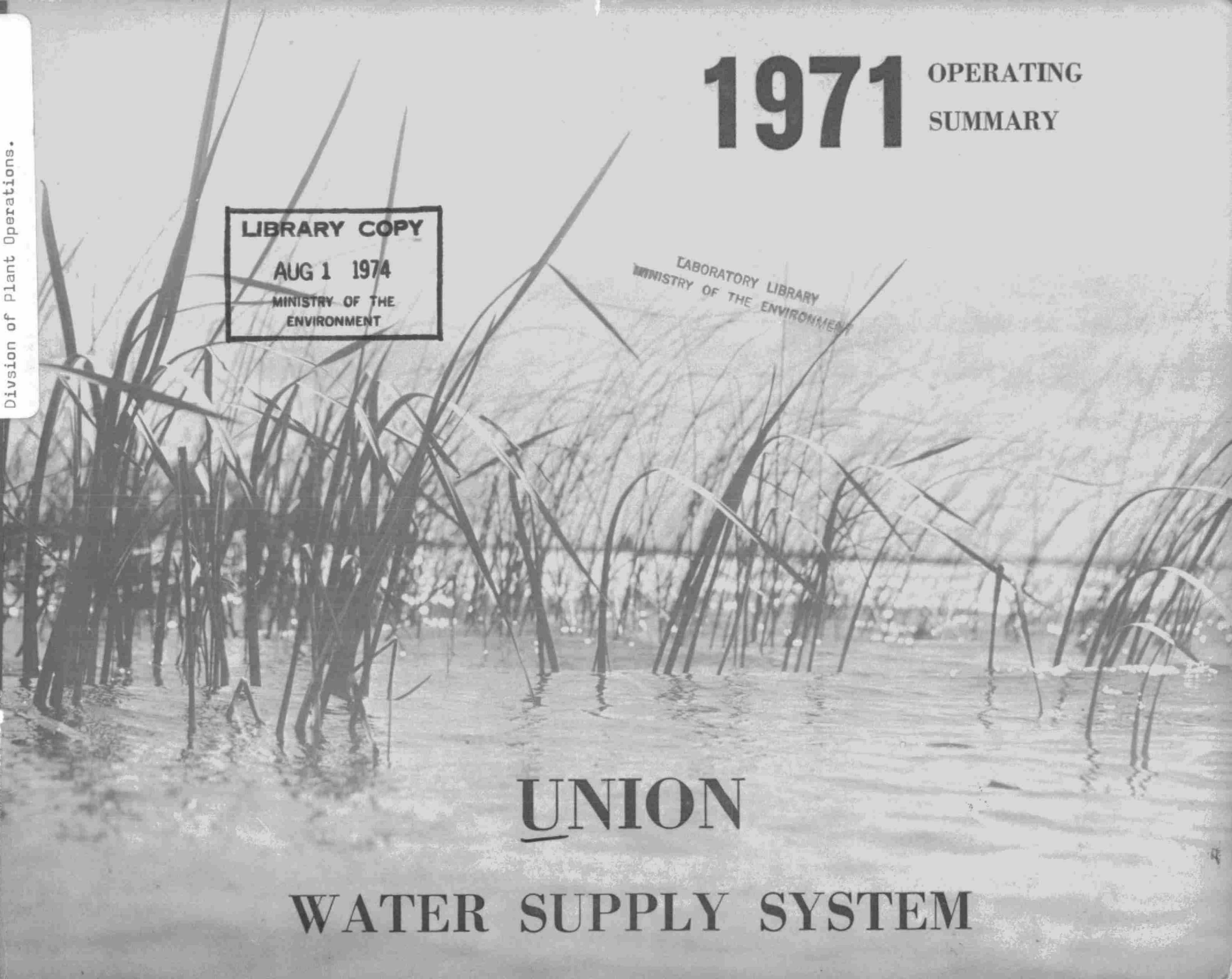

1971 OPERATING SUMMARY

UNION WATER SUPPLY SYSTEM

Ontario Water Resources Commission.
Divsion of Plant Operations.

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Water management in Ontario

Ontario
Water Resources
Commission

We are pleased to submit for your consideration a summary of operating during 1971 of the water supply system serving your community.

This operating summary contains parameters normally used to measure plant performance and to forecast demands for increased service, as well as relevant cost data. It is our objective to provide an adequate supply of safe and attractive water.

DS Caverly
D.S. Caverly,
General Manager.

D McTavish
D.A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

ONTARIO WATER RESOURCES COMMISSION

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K. H. Sharpe
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DIVISION OF PLANT OPERATIONS

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D. A. McTavish

Assistant Director
C. W. Perry

Regional Supervisor
P. J. Osmond

Operations Engineer
R. E. Brown

135 St. Clair Avenue West
Toronto 195

UNION
WATER SYSTEM

operated for the

TOWN OF ESSEX
TOWN OF KINGSVILLE
TOWN OF LEAMINGTON
TOWNSHIP OF GOSFIELD NORTH
TOWNSHIP OF GOSFIELD SOUTH
TOWNSHIP OF MAIDSTONE
TOWNSHIP OF MERSEA
TOWNSHIP OF ROCHESTER
H.J. HEINZ COMPANY OF CANADA LIMITED

by the

ONTARIO WATER RESOURCES COMMISSION

1971 ANNUAL OPERATING SUMMARY

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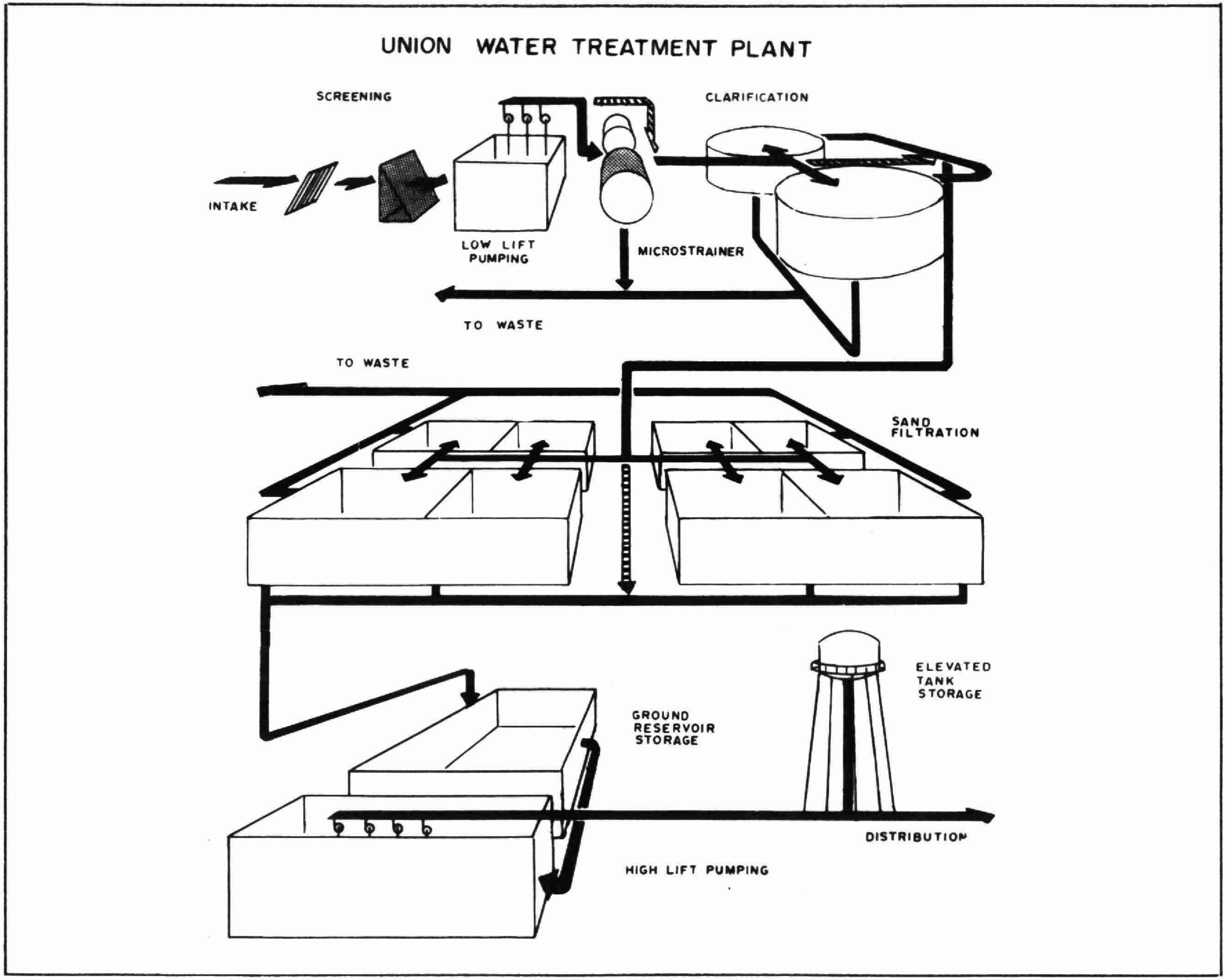

UNION WATER TREATMENT PLANT
SCREENING
CLARIFICATION
INTAKE
LOW LIFT PUMPING
MICROSTRAINER
TO WASTE
TO WASTE
SAND FILTRATION
ELEVATED TANK STORAGE
GROUND RESERVOIR STORAGE
DISTRIBUTION
HIGH LIFT PUMPING

DESIGN DATA

NOMINAL CAPACITY

10.0 MIGD

RAW WATER SOURCE

Lake Erie

CAPACITY OF UNITS

Intake: 32 mgd @ 3.5 ft/sec avg. vel.
Low Lift Pumps: 14.6 mgd @ 132 ft tdh
Microstrainers: 16.0 mgd
Clarifiers: 16.0 mgd
Filters: 8.0 mgd @ 2.15 gpm/ft^2
Backwash Pump: 5520 USGPM @ 35 ft tdh
High Lift Pumps: 24.3 mgd @ 200 ft tdh

MICROSTRAINING

Two Glenfield 10 ft dia x 10 ft with MKI (35 micron) fabric @ 16.0 mgd total capacity

CLARIFICATION

One Graver and one Eimco Reactivator, each 94 ft dia x 19 ft swd
Volume: 1.65 mil gal
Detention: 2.5 hr @ 16.0 mgd
Overflow: 1160 gpd/ft^2 @ 16.0 mgd

FILTRATION

Type: Gravity sand filter - 27" sand depth
Size: Four 18' x 36' double filters
Rate: 2.15 gpm/ft^2 @ 8.0 mgd (nominal capacity)
Backwash Rate: 13 gpm/ft^2
Jet wash - Palmer surface jet wash

CHLORINATION

Three Wallace & Tiernan 2000 lb/day chlorinators

HIGH LIFT PUMPING

#6 - 2.60 mgd @ 200' head
#7 - 3.75 mgd @ 200' head
#8 - 5.19 mgd @ 200' head
#9 - 10.35 mgd @ 200' head
#10 - 1.15 mgd @ 200' head

STORAGE

Reservoir: 1.73 mil gal
Elevated Tank: 0.33 mil gal

INTAKE

10' dia. steel bellmouth in 18' x 18' timber crib
Depth above crib - 15 ft (minimum)
Pipe Size: 1400 ft of 54" dia asbestos coated corrugated steel pipe-about $\frac{1}{4}$ mile to plant

SCREENING

Coarse Screens - 3" cc
Fine Screens - $\frac{1}{4}$" mesh travelling screens

LOW LIFT PUMPING

#1 - 2.16 mgd @ 100' TDH
#2 - 4.32 mgd @ 100' TDH
#3 - 4.32 mgd @ 100' TDH
#4 - 2.16 mgd @ 100' TDH
#5 - 6.00 mgd @ 135' TDH

*Note: As of November 1970

'71 Review

GENERAL

No capacity problems were experienced during the year as a result of the expansion of the plant completed in 1970. Further modifications to increase the nominal capacity above 10 MGD were initiated for implementation during 1972.

EXPENDITURES

The system operating cost of $183, 416. 49 was higher by 14. 6 percent than 1970, however the cost per thousand gallons treated decreased to 10. 75 cents. The increased operating cost was due mainly to salary, chemical and power cost increases attributable mainly to an increase in flows of 12. 4 percent.

PLANT FLOWS

Plant Output

During 1971, the main plant meter recorded 1696. 3 million gallons, an increase of 12. 4 percent over 1970. The area meters totaled 1644. 175 million gallons. The difference between meters is well within acceptable meter errors. The average daily flow of 4. 65 million gallons represents 46. 5 percent of the nominal plant design capacity of 10 MGD. The maximum daily flow of 10. 2 million gallons occurred on July 22 and was slightly more than 100 percent of nominal capacity.

Consumption of Participants

All participants showed substantial increases in their consumption over 1970, as flows were the highest in 5 years. Each participant maintained the same relative position with respect to percentage of the total with only minor changes in value and all participants consumed more than their minimum annual quota. Leamington, Mersea, Gosfield South and Maidstone all exceeded their maximum monthly quota. Both Mersea and Gosfield South exceed the maximum daily quota on an average daily flow basis for their peak months. Although the agreements provide for penalties for exceeding the quota, the Local Advisory Committee decided that no penalties would be applied for 1971. It should be noted that Kingsville did not receive water from the system in 1971.

Peak Demands

The following chart compares actual demands with the systems ability to supply the demand. The capacity is based on a nominal 10 MGD as limited by the filters, the usable storage capacity of 1.73 MG in the underground reservoir and 0.33 MG in the elevated tank nearest the plant. The maximum pumping rate for the plant for short periods is 23 MGD. It should be noted that at a 23 MGD rate there is no spare high lift pumping capacity; at flows greater than 14 MGD, the low lift is unable to supply all the demand; and that the filters in 1971 were unable to handle more than 10 MGD under normal conditions.

PROCESS CHEMICALS

A total of 75,370 gallons of 50 percent alum solution was used as a coagulant in the operation of the clarifiers during 1971. The average dosage was 29 mg/l with the dosage ranging from 27 to 31 mg/l.

A total of 5,900 pounds of activated carbon at an average dosage of 3.9 mg/l was needed for taste and odour control from May through October. The amount required was more than twice that required in 1970.

A total of 18,110 pounds of sodium silicate at an average dosage of 3.7 mg/l and 4,096 pounds of sodium bicarbonate at an average dosage of 0.8 mg/l were used to produce activated silica which was used as a coagulant aid when alum alone would not produce the desired results.

A total of 48,400 pounds of chlorine was used during 1971. The dosage for pre-chlorination was 2.0 mg/l and for post chlorination was 0.7 mg/l to produce a residual of 0.5 mg/l in the treated water pumped to the distribution system.

Consumptions of all chemicals increased over 1970 mostly due to the increased demand for water.

PERIOD	Maximum Capacity MGD	Date	Maximum Demand For Period	% of Maximum Capacity
4 hours	22	July 22/71	11.8	54
8 hours	16	July 22/71	11.8	74
12 hours	14	July 22/71	11.8	85
1 day	12	July 22/71	10.2	85
2 days	11	July 22 to 23	10.2	93
3 days	10.7	July 21 to 23	10.1	95
4 days	10.5	July 20 to 23	9.6	91
5 days	10.4	July 19 to 23	9.1	88
6 days	10.35	July 18 to 23	8.6	83
1 week	10.3	July 17 to 23	8.4	82
1 month	10.1	August	6.9	68

If 90% of capacity is assumed to be critical, then the flows reached critical levels on a 2, 3 and 4 day basis.

WATER QUALITY

The raw water hardness is in the range considered as moderately hard and did not change significantly from 1970. Alkalinity of the raw water was again slightly lower in 1971 than in the previous year. Hardness, alkalinity, pH, chloride and fluoride are not altered significantly by the treatment process now in use.

The iron content of the raw water was again lower in 1971 than in 1970 and treatment resulted in water well below the recommended limit of 0.3 mg/l.

Analyses for nitrogen and phosphorus on a regular basis was initiated in 1970 to provide background information for future reference. These constituents are not present in significant amounts at present.

The raw water colour and turbidity averages were considerably lower than in 1970. The average concentration of both colour and turbidity in the treated water was maintained within the desirable standards and were also lower than in 1970.

Samples of raw and treated water were not tested for mercury as in the past due to the continued absence of the element in past tests. Spot checks will occasionally be made in the future.

Raw water coliform concentrations averaged only 17 per 100 ml (geometric mean) as compared with 130 in 1970. Only three samples out of 494 showed the presence of low concentrations of coliforms in the distribution system.

The average algae concentration in the raw water was 4803 ASU, slightly lower than in 1970. Treatment was very effective, removing over 99 percent of the algae from the water. It should be noted that the raw water algae concentration is quite high in comparison to most areas in the Great Lakes.

CONCLUSIONS

During 1971 the maximum demand equalled or exceeded 90 percent of the plant capacity over periods of 2 days to 4 days. This was the first year at the new capacity, therefore past performance comparisons cannot be made. The peak month of August averaged 68 percent of the revised plant capacity as compared to 65 percent of the revised capacity during 1970. The total demand for the year changed significantly over 1971. The cost of production decreased from 10.89 cents per 1,000 gallons to 10.75 cents.

Overall raw water quality does not appear to be changing much over the years.

Treated water continued to remain at high quality levels throughout the year.

PROJECT COSTS and FLOWS TO PARTICIPANTS

NET CAPITAL COST (Final)	$3,841,802.00

Note: The participants' share of net capital cost varies each year on the basis of consumption.

DEBT RETIREMENT BALANCE AT CREDIT (Sinking Fund) December 31, 1971

Essex	$ 119,761.78
Leamington	191,639.20
H.J. Heinz	264,207.49
Gosfield North	20,323.95
Gosfield South	42,607.83
Mersea	77,281.54
Maidstone	23,378.31
Rochester	6,369.00
TOTAL	$ 745,569.10

1971 COSTS TO EACH PARTICIPANT

TOTAL

Essex	$ 65,531.23
Leamington	113,082.22
H.J. Heinz	157,594.22
Gosfield North	12,727.22
Gosfield South	34,170.85
Mersea	58,504.63
Maidstone	12,505.40
Rochester	4,552.47
	$ 458,668.24

NET OPERATING

Essex	$22,999.95	
Leamington	47,228.88	
H.J. Heinz	65,817.07	
Gosfield North	4,477.01	
Gosfield South	14,521.70	
Mersea	23,577.92	
Maidstone	3,189.89	
Rochester	1,604.07	
		$183,416.49

DEBT RETIREMENT

Essex	$ 5,151.94	
Leamington	7,950.57	
H.J. Heinz	11,080.41	
Gosfield North	999.81	
Gosfield South	2,385.56	
Mersea	4,225.93	
Maidstone	1,142.49	
Rochester	357.29	
		$ 33,294.00

RESERVE

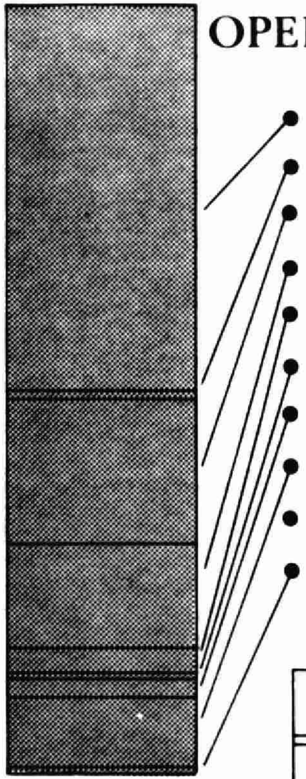
Essex	$ 3,945.87	
Leamington	6,442.02	
H.J. Heinz	8,977.79	
Gosfield North	762.62	
Gosfield South	1,952.13	
Mersea	3,348.42	
Maidstone	766.44	
Rochester	272.71	
		$ 26,468.00

INTEREST CHARGED

Essex	$33,433.47	
Leamington	51,460.75	
H.J. Heinz	71,718.95	
Gosfield	6,487.78	
Gosfield South	15,311.46	
Mersea	27,352.36	
Maidstone	7,406.58	
Rochester	2,318.40	
		$215,489.75
TOTAL COST		$458,668.24

1971 COSTS

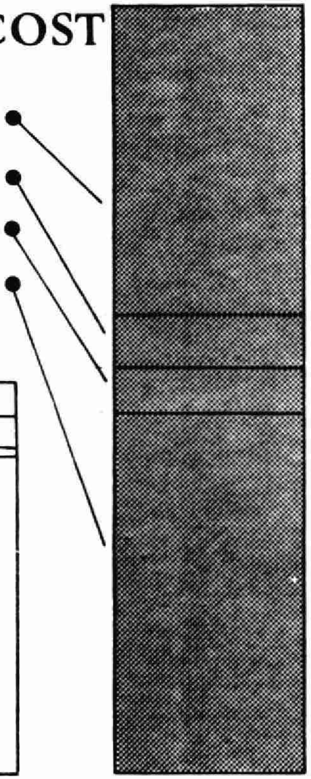
OPERATING COSTS



PAYROLL	49 %
FUEL	1 %
POWER	18 %
CHEMICALS	13 %
GENERAL SUPPLIES	3 %
EQUIPMENT	< 1 %
REPAIRS & MAINTENANCE	2 %
SUNDRY	12 %
WATER	NIL %
TRAVEL	1 %

TOTAL ANNUAL COST

NET OPERATING	40 %
DEBT RETIREMENT	7 %
RESERVE	6 %
INTEREST	47 %



YEARLY OPERATING COSTS

YEAR	SEWAGE TREATED in million gallons	TOTAL OPERATING COSTS	TREATMENT COSTS in cents per thousand gal
1967	1506.65	$130,349.36	8.65¢
1968	1465.52	137,283.49	9.37
1969	1445.28	146,059.93	10.11
1970	1546.66	159,234.94	10.89
1971	1696.	182,403.77	10.7

MONTHLY OPERATING COSTS

MONTH	TOTAL EXPENDITURE	REGULAR PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICALS	GENERAL SUPPLIES	EQUIPMENT	REPAIRS and MAINTENANCE	SUNDRY	TRAVEL
JAN	7511.78	6289.73	-	-	-	754.32	305.04	-	162.69	-	-
FEB	16853.58	9460.66	-	549.75	4527.32	1340.52	567.70	-	33.76	259.82	114.05
MAR	11690.19	6272.94	-	378.85	2140.48	2058.55	202.95	53.32	38.39	469.81	74.90
APR	11359.79	6334.17	32.00	467.77	2122.84	730.55	966.32	-	197.37	267.66	241.11
MAY	10550.92	6344.57	-	228.56	2216.68	730.03	286.25	577.50	-	12.23	155.10
JUNE	12653.10	6804.34	(594.18)	49.90	2901.54	2393.56	451.63	25.30	213.00	311.01	97.00
JULY	11757.38	6357.11	-	14.54	3112.99	1214.39	378.08	-	17.75	514.62	147.90
AUG	12956.40	6494.11	-	249.74	3565.95	1454.15	555.63	101.24	426.38	-	109.20
SEPT	18239.32	6361.79	-	66.94	3558.77	2607.38	175.10	-	1684.78	3682.31	102.25
OCT	19783.67	11238.41	-	-	3879.79	3650.70	175.64	505.86	49.27	172.45	111.55
NOV	16023.20	8756.67	594.18	107.72	2470.13	3204.45	457.35	-	350.72	33.38	48.60
DEC	33024.44	9900.27	-	515.16	2405.33	3496.05	710.65	-	(325.98)	15825.48	497.48
TOTAL	182403.77	90614.77	32.00	2628.93	32901.82	23634.65	5232.34	1263.22	2848.13	21548.77	1699.14
UNION EAST	297.65				57.92					239.73	
UNION WEST	715.07				462.67					252.40	
GRAND TOTAL	183416.49				33422.41					22040.90	

ANNUAL CONSUMPTION BY PARTICIPANTS

PARTICIPANT	MINIMUM ANNUAL QUOTA REVISIONS				ANNUAL CONSUMPTION in millions of gallons and as percent of total (listed below)									
	ORIGINAL	REVISED Jan.1,63	PLANT EXPANSION Nov 1, 70	KINGSVILLE and ROCHESTER Entry-Jan 1,71	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
H. J. HEINZ	520	520	520	520	594.00 40.0	572.23 38.0	573.48 39.1	578.71 40.0	551.59 37.7	592.10 36.0				
LEAMINGTON	426	400	400	380	416.38 28.0	416.57 27.6	391.85 26.7	278.71 26.2	379.09 25.9	424.78 25.8				
ESSEX	160	160	180	180	179.12 12.0	195.49 13.0	197.82 13.5	184.72 12.7	188.12 12.9	202.70 12.3				
MERSEA	12.5	70	140	140	158.53 10.7	165.23 11.0	160.61 11.0	152.48 10.6	173.64 11.9	212.18 12.9				
GOSFIELD S	16.5	40	100	100	87.37 5.9	102.66 6.8	83.12 5.7	93.82 6.5	102.49 7.0	130.65 7.9				
GOSFIELD N	23.5	20	35	35	32.93 2.2	31.06 2.1	35.82 2.4	27.81 1.9	31.87 2.2	39.50 2.4				
MAIDSTONE See Note C	12	10	20	20	11.48 0.8	14.72 1.0	13.70 0.9	18.56 1.3	23.17 1.6	25.92 1.6				
KINGSVILLE See Note A	-	-	-	133	- -	- -	- -	- -	- -	- -				
ROCHESTER See Note B	-	-	-	14	6.71 0.5	8.70 0.6	9.12 0.6	11.47 0.8	12.74 0.9	16.35 1.0				
TOTAL	1170.5	1220	1395	1522	1486.52	1506.66	1465.52	1445.28	1462.72	1644.18				

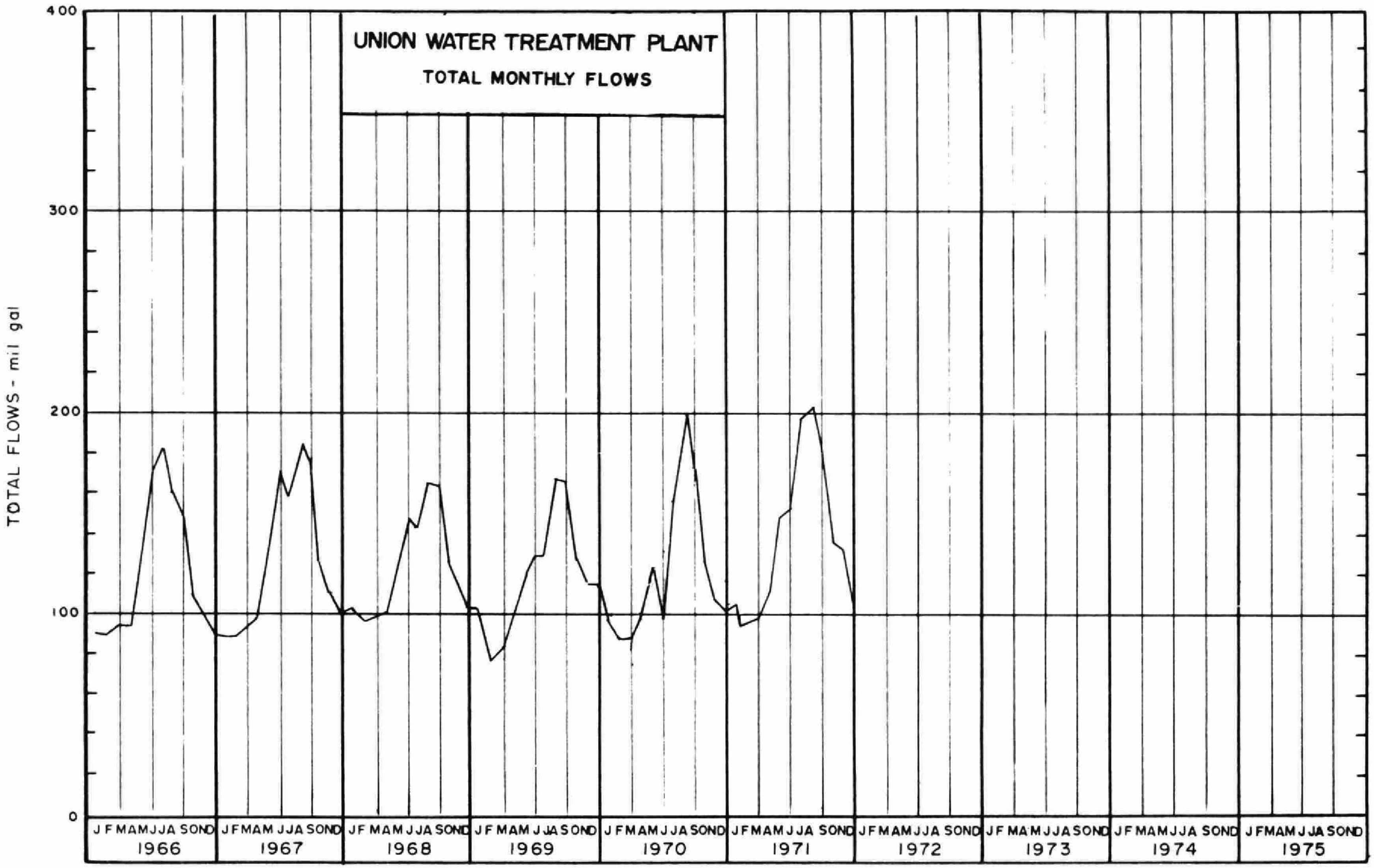
Note A - Kingsville became participant Jan 1/71, however water is not available until completion of project.
B - Rochester became participant Jan 1/71, purchased water through Maidstone prior to this date.
C - Rochester flows have been deducted from Maidstone flows.

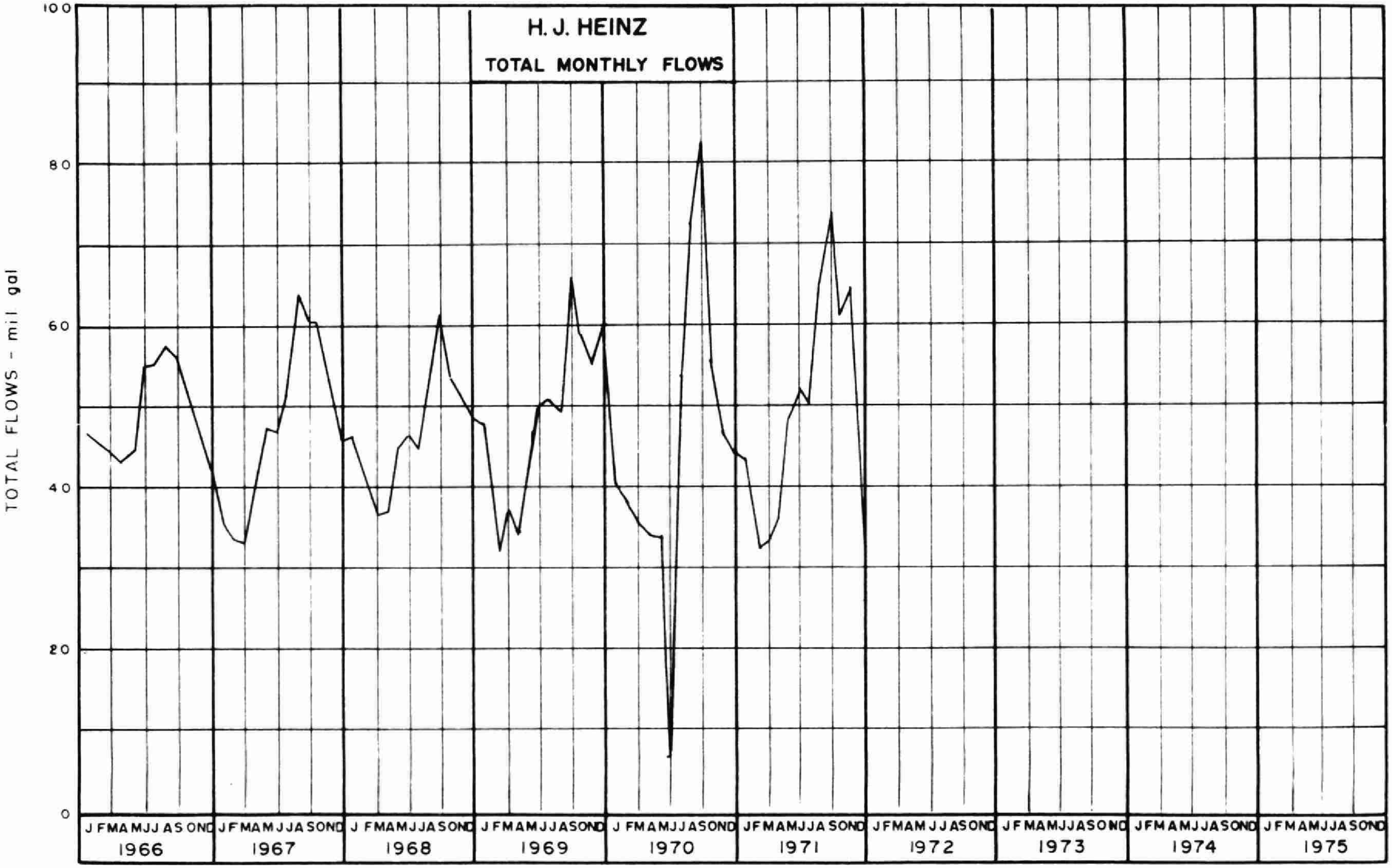
ADJUSTED MONTHLY FLOWS

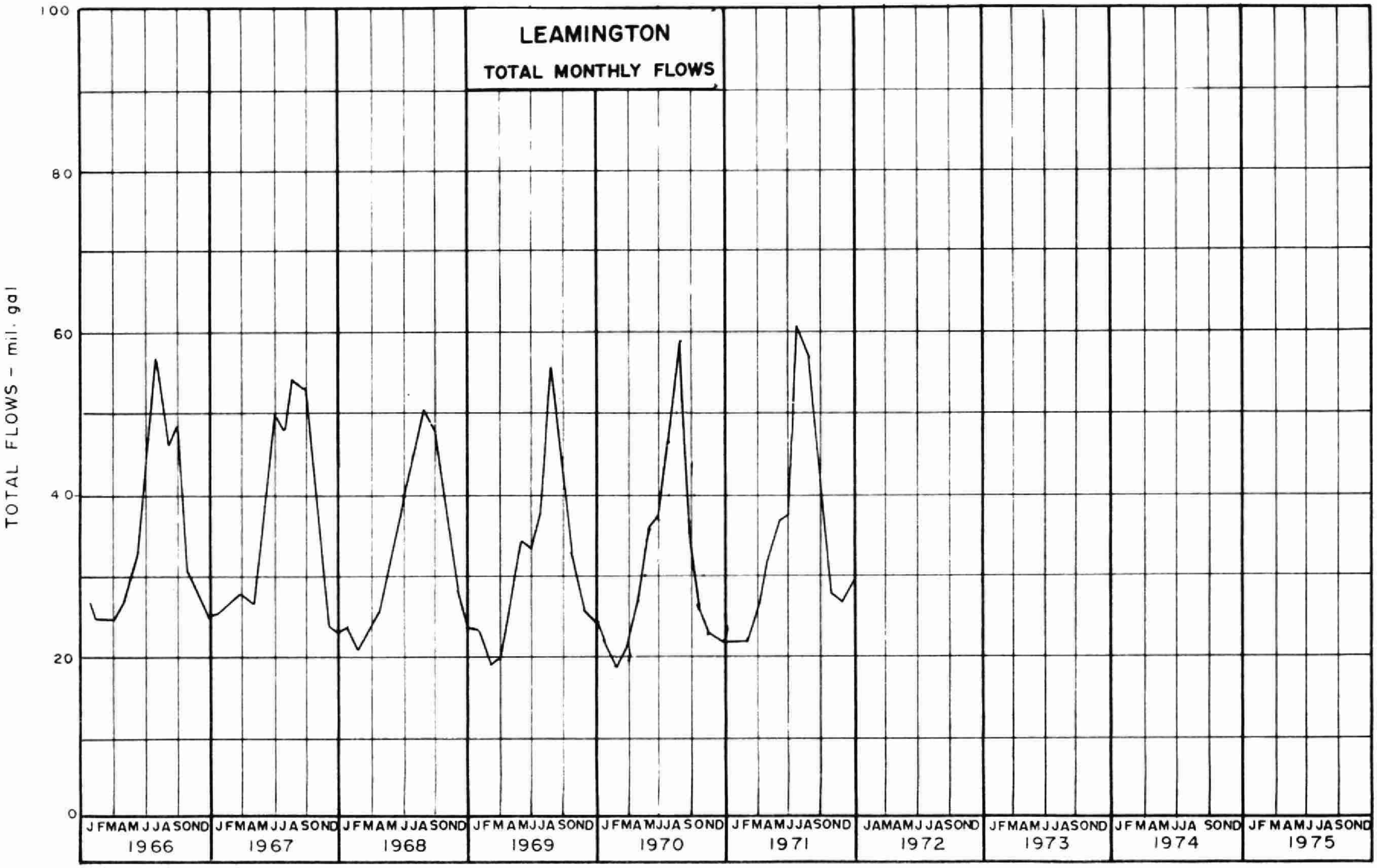
(in millions of gallons)

MONTH	H. J. HEINZ	LEAMINGTON	ESSEX	MERSEA	GOSFIELD SOUTH	GOSFIELD NORTH	MAIDSTONE	ROCHESTER	KINGSVILLE	TOTAL
JAN	44.753	22.855	15.260	12.000	4.997	3.075	1.656	1.258	0.0	105.854
FEB	32.541	21.013	14.030	11.033	4.595	2.828	1.522	1.156	0.0	88.718
MAR	33.650	27.103	11.757	13.211	5.230	2.506	1.305	1.114	0.0	95.876
APR	36.747	32.464	14.082	15.824	6.264	3.002	1.563	1.335	0.0	111.281
MAY	49.096	37.450	17.474	22.358	12.534	3.038	2.875	1.343	0.0	146.168
JUNE	52.553	38.207	17.828	22.809	12.787	3.100	2.934	1.371	0.0	151.589
JULY	50.481	60.646	24.358	28.680	20.969	3.485	3.761	1.610	0.0	193.990
AUG	64.511	57.572	23.124	27.227	19.907	3.309	3.572	1.528	0.0	200.750
SEPT	74.422	41.513	20.696	19.056	18.785	4.586	2.481	1.558	0.0	183.097
OCT	61.138	28.610	14.264	1.3133	12.947	3.160	1.710	1.073	0.0	136.035
NOV	64.548	27.067	14.077	12.671	5.492	3.498	1.200	1.417	0.0	129.970
DEC	27.663	30.279	15.747	14.174	6.143	3.912	1.343	1.586	0.0	100.847
TOTAL	592.103	424.779	202.697	212.176	130.650	39.499	25.922	16.349	0.0	1644.175
Max. Monthly Quota	81.998	59.921	28.385	22.075	15.768	5.529	3.154	2.208	20.971	240
Max. Daily Quota	3.205	2.342	1.109	0.864	0.616	0.216	0.123	0.086	0.819	8.5618
Avg. day in max. month	2.23	1.95	0.775	0.925	0.675	0.153	0.121	0.052	0.0	6.68

The underlined monthly flows denote months in which the max. monthly quota was exceeded


UNION WATER TREATMENT PLANT
TOTAL MONTHLY FLOWS
TOTAL FLOWS - mil gal
400
300
200
100
0
J F M A M J J A S O N D
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975


H. J. HEINZ
TOTAL MONTHLY FLOWS
TOTAL FLOWS - mil gal
100
80
60
40
20
0
J F M A M J J A S O N D
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975


LEAMINGTON
TOTAL MONTHLY FLOWS
TOTAL FLOWS - mil. gal
100
80
60
40
20
0
J F M A M J J A S O N D
1966
J F M A M J J A S O N D
1967
J F M A M J J A S O N D
1968
J F M A M J J A S O N D
1969
J F M A M J J A S O N D
1970
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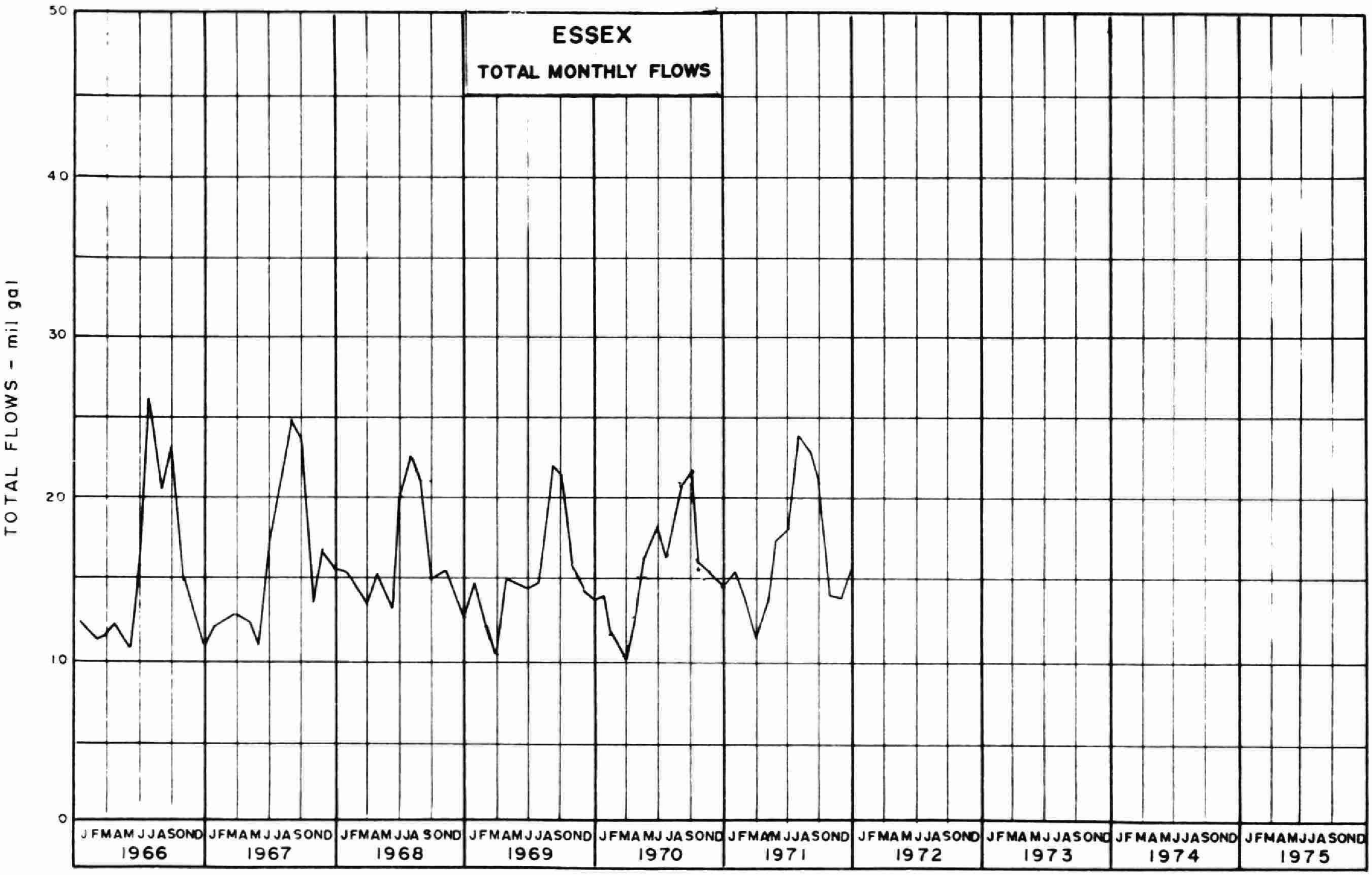
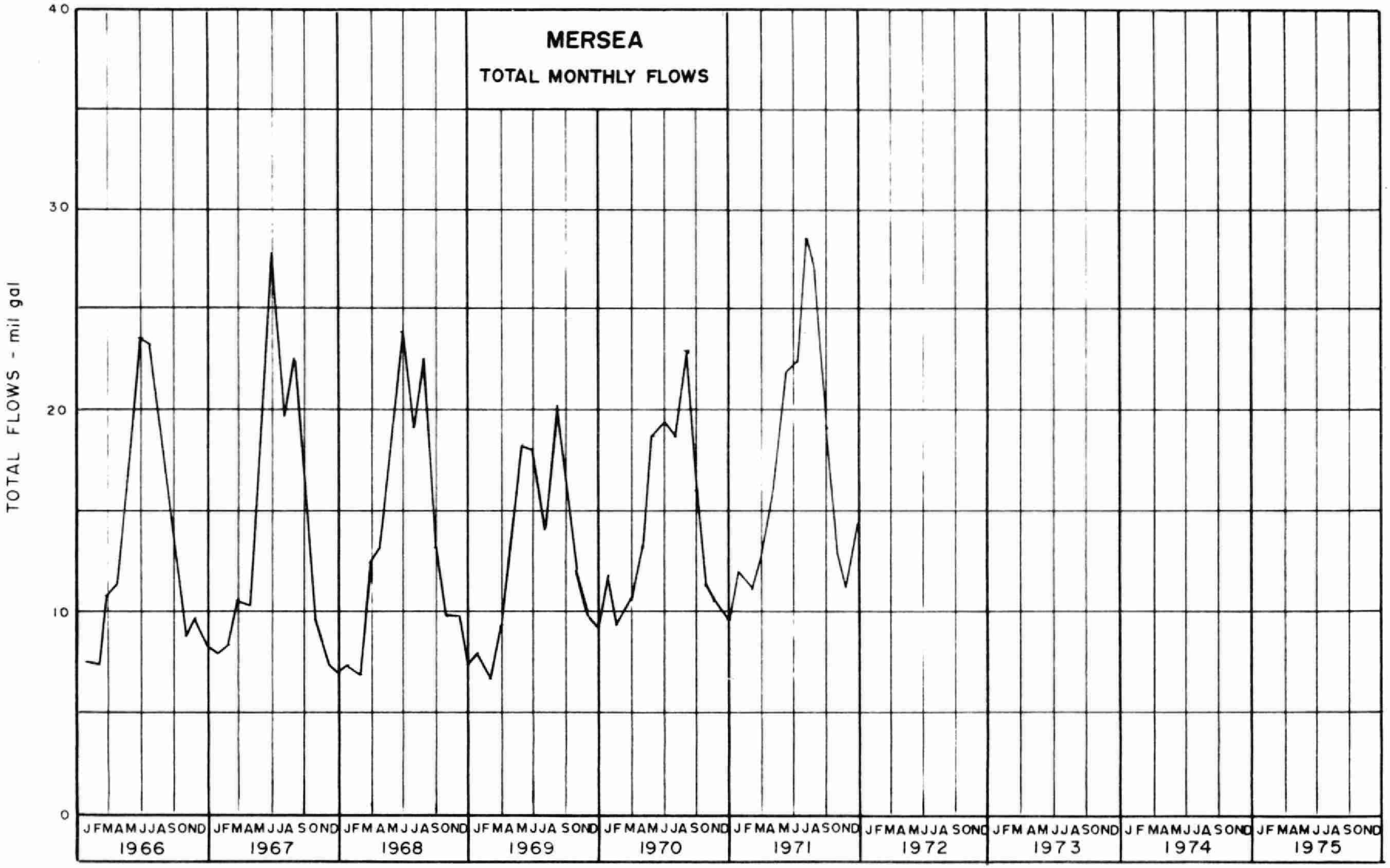
1974
J F M A M J J A S O N D
1975


ESSEX
TOTAL MONTHLY FLOWS
TOTAL FLOWS - mil gal
50
40
30
20
10
0
JFMAMJJASOND
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975


MERSEA
TOTAL MONTHLY FLOWS
TOTAL FLOWS - mil gal
40
30
20
10
0
JFMAMJJASOND
1966
JFMAMJJASOND
1967
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1968
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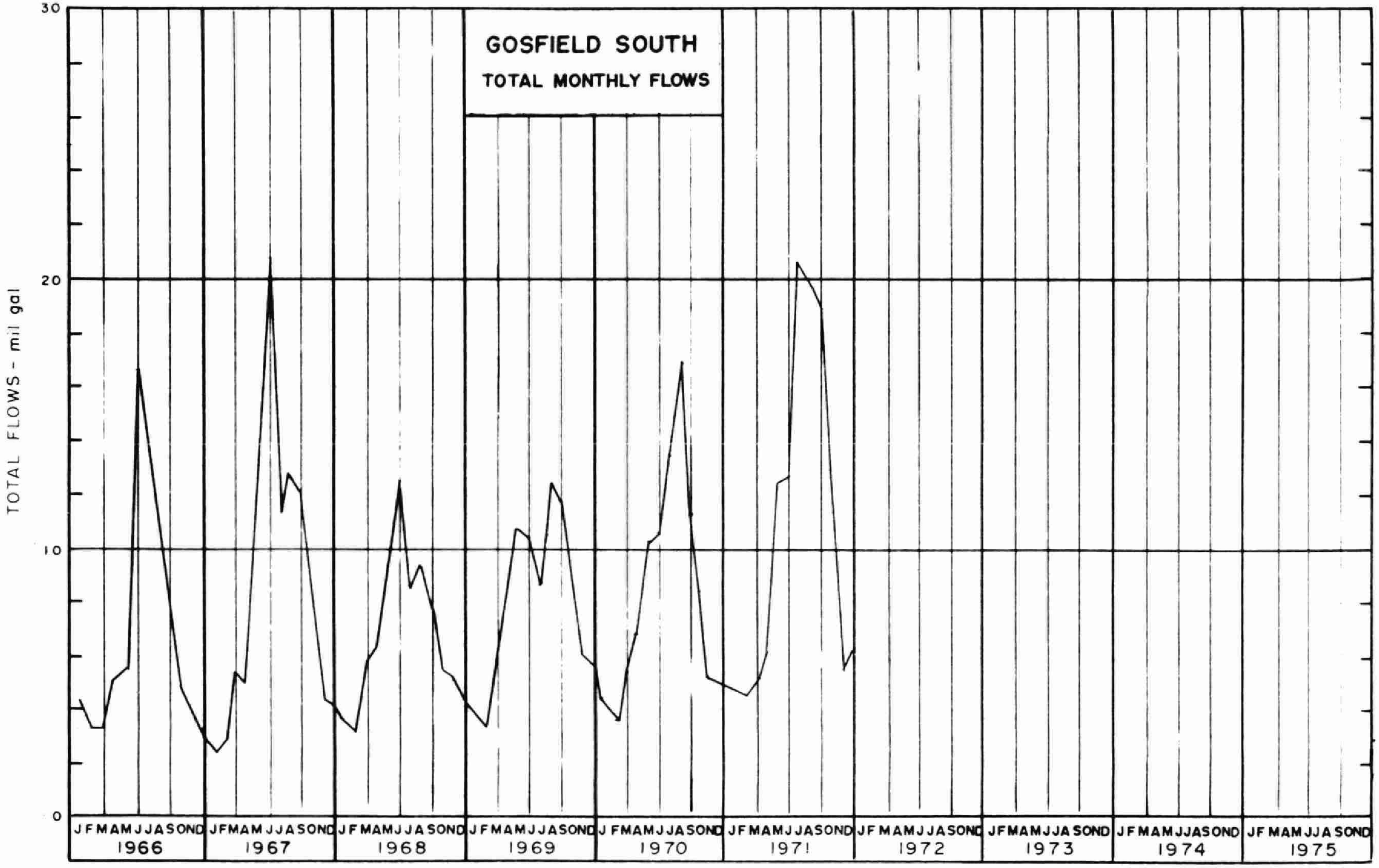
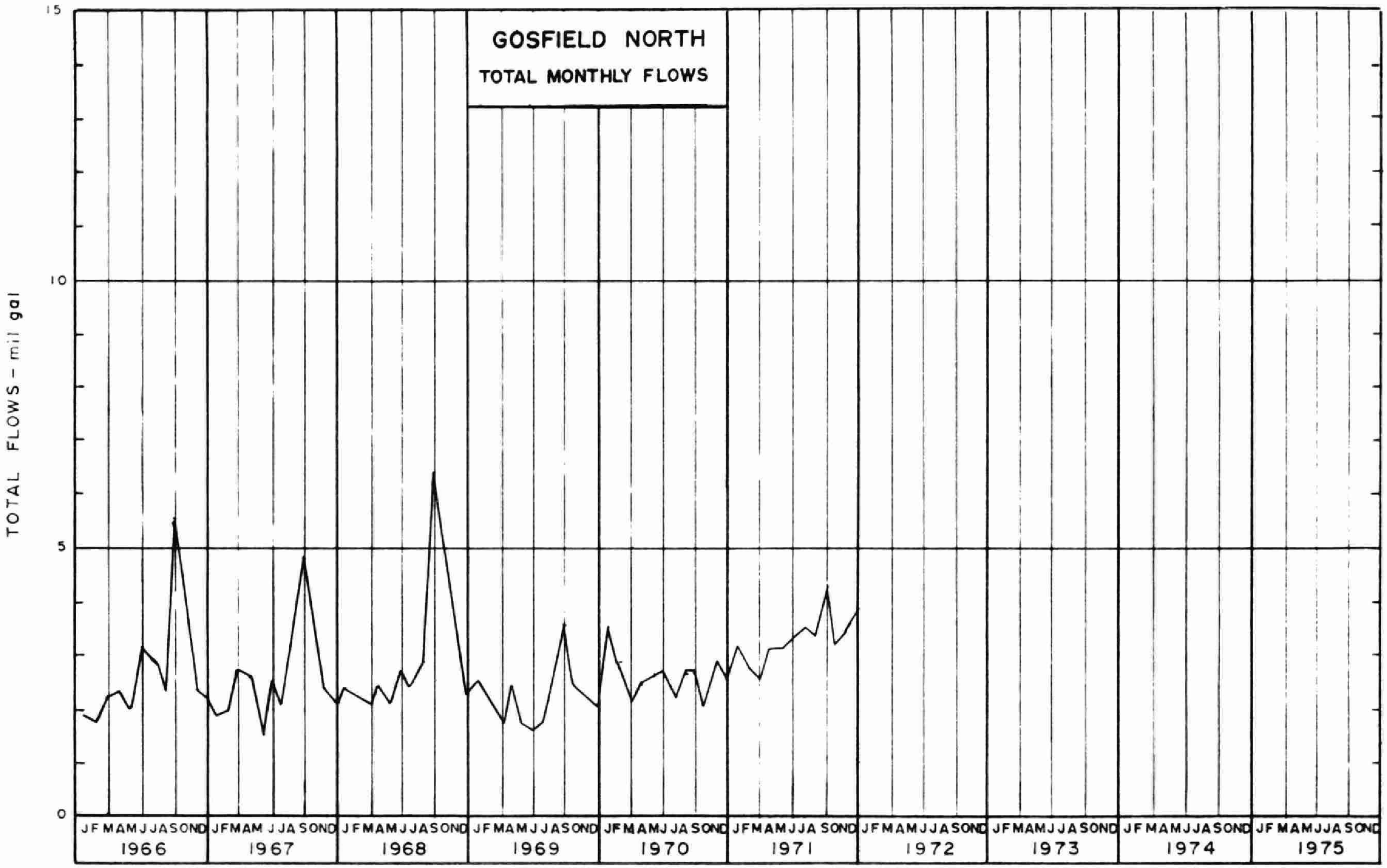
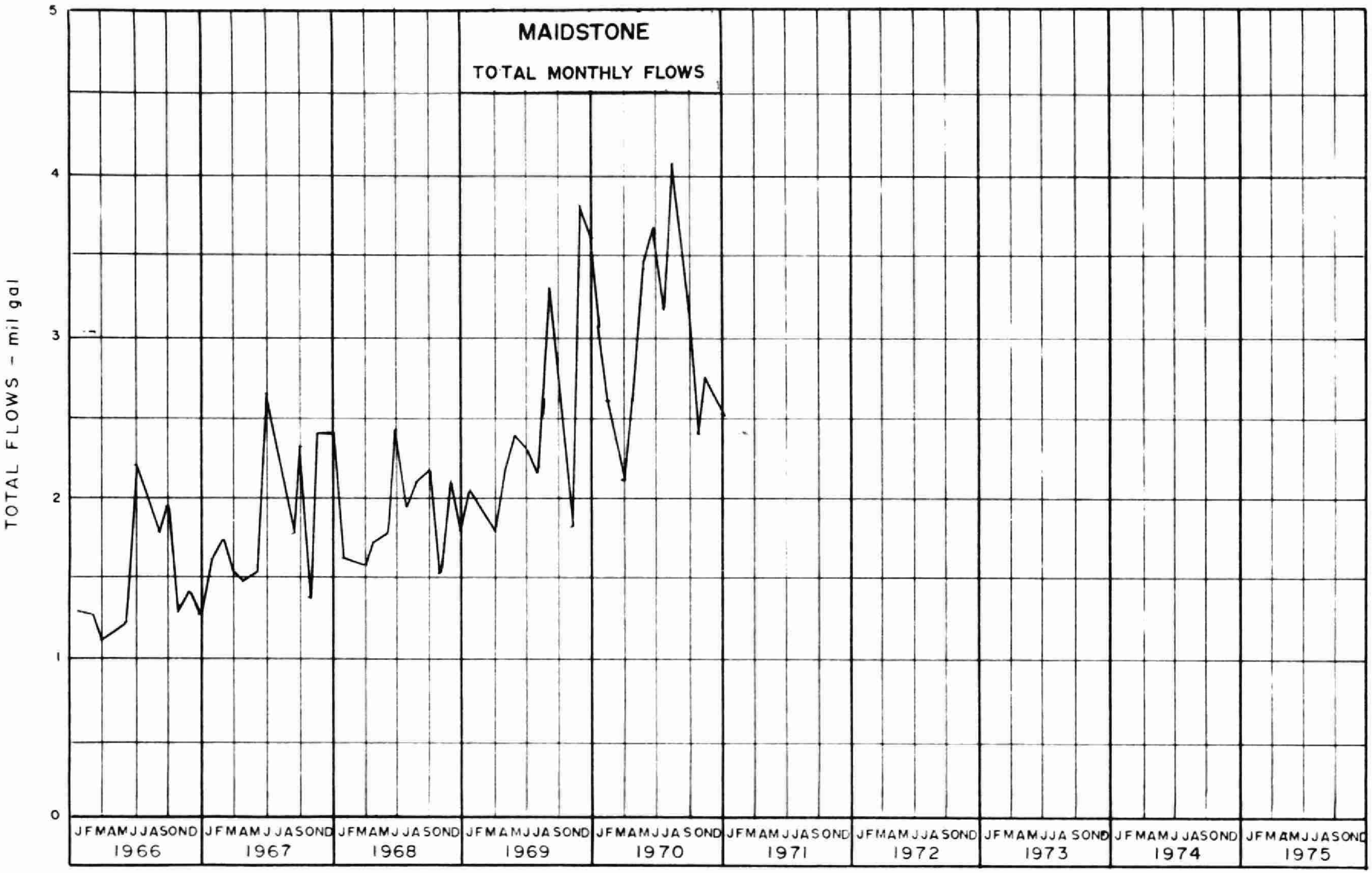
1975

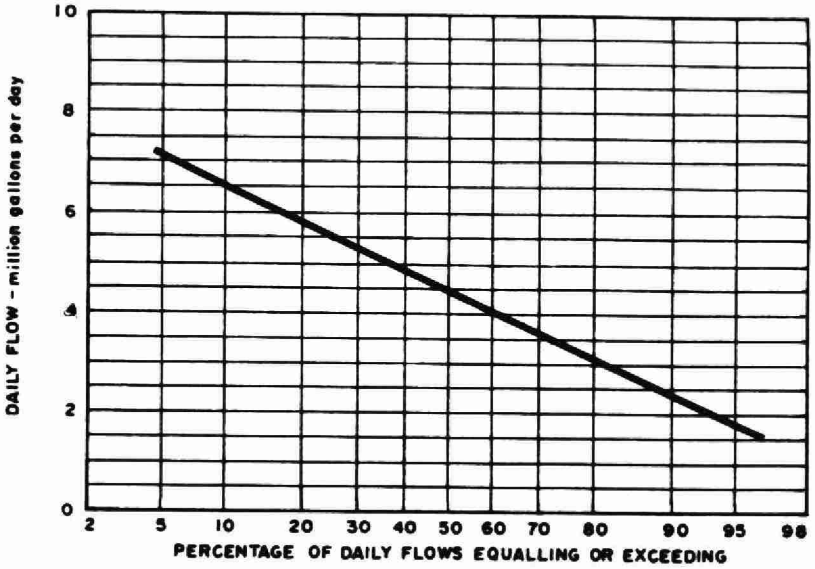

GOSFIELD SOUTH
TOTAL MONTHLY FLOWS
TOTAL FLOWS - mil gal
30
20
10
0
J F M A M J J A S O N D
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975

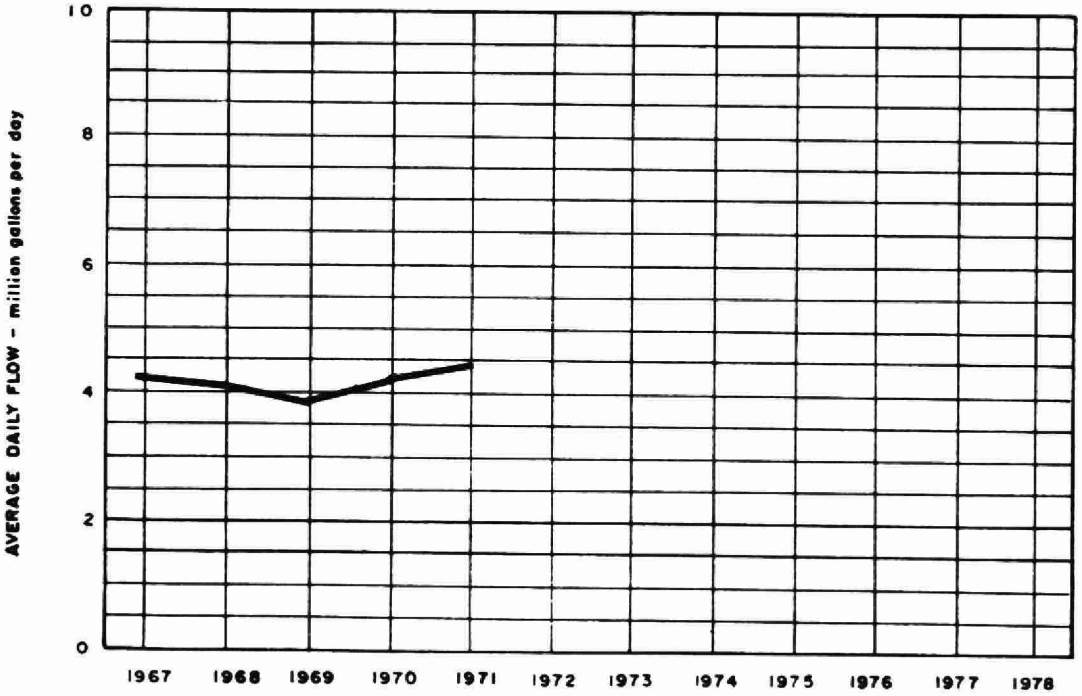

GOSFIELD NORTH
TOTAL MONTHLY FLOWS
TOTAL FLOWS - mil gal
15
10
5
0
JFMAMJJASOND
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975


MAIDSTONE
TOTAL MONTHLY FLOWS
TOTAL FLOWS - mil gal
0
1
2
3
4
5
JFMAMJJASOND 1966
JFMAMJJASOND 1967
JFMAMJJASOND 1968
JFMAMJJASOND 1969
JFMAMJJASOND 1970
JFMAMJJASOND 1971
JFMAMJJASOND 1972
JFMAMJJASOND 1973
JFMAMJJASOND 1974
JFMAMJJASOND 1975

PROCESS DATA

FLOWS

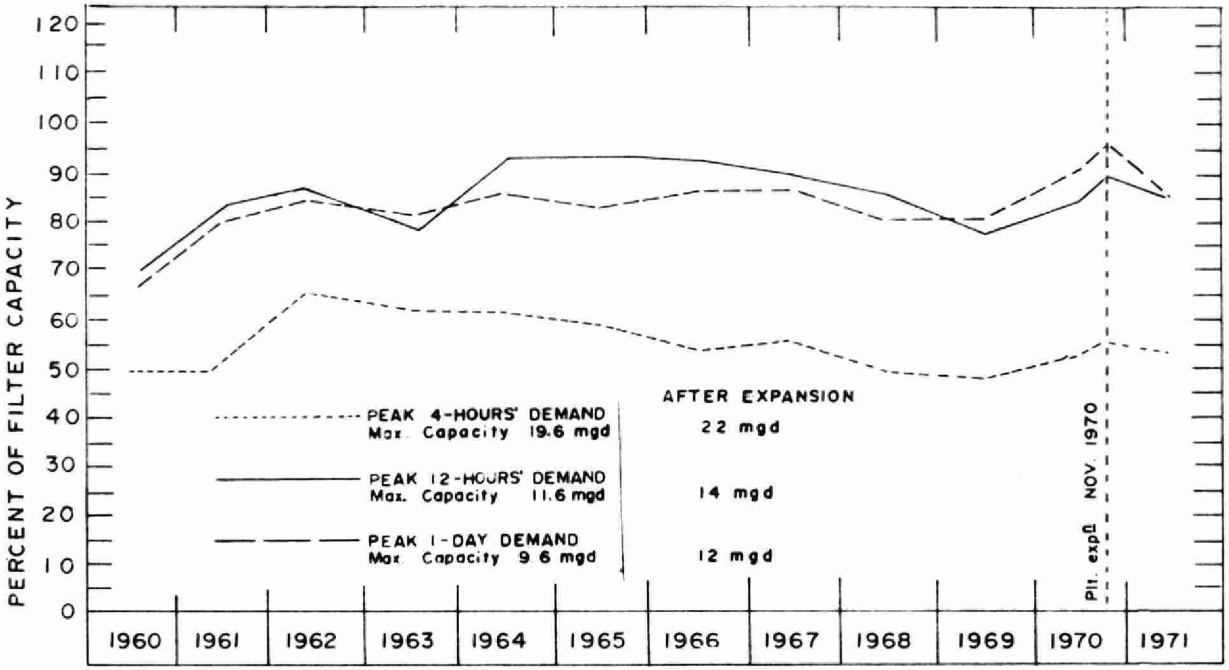


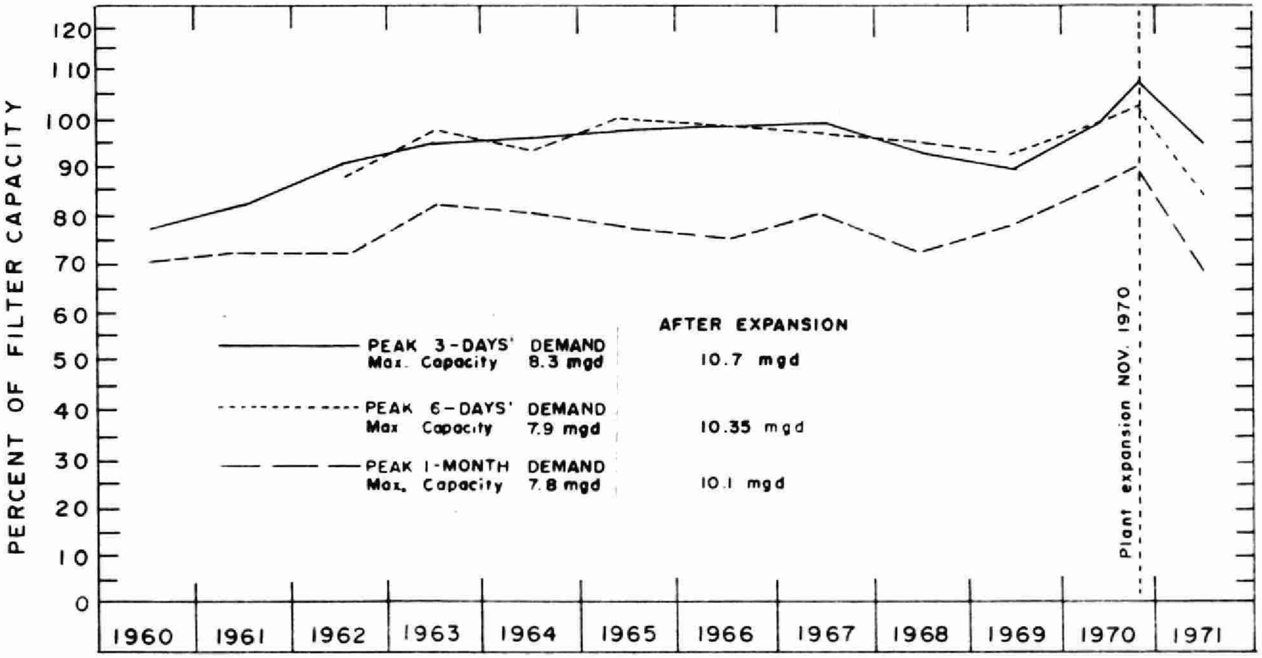


DESIGN CAPACITY 10 MGD

PEAK DEMAND

PERCENT OF FILTER CAPACITY





PLANT PERFORMANCE

MONTH	FLOWS				RAW WATER		TREATED WATER					
							TURBIDITY		COLOUR		TEMPERATURE	
	TOTAL PLANT OUTPUT million gallons	AVERAGE DAILY FLOW million gallons	MAXIMUM DAY'S FLOW million gallons	MAXIMUM RATE mgd	TURBIDITY (AVERAGE) JTU	COLOUR (AVERAGE) App. units	AVERAGE JTU	MAXIMUM JTU	AVERAGE App. units	MAXIMUM App. units	AVERAGE °F	MAXIMUM °F
JAN	103.4	3.34	4.8	6.8	10.2	< 5	.8	.8	< 5	< 5	34	34
FEB	87.1	3.11	3.8	5.2	14.0	< 5	.9	1.3	< 5	< 5	34	34
MAR	97.4	3.14	3.7	6.5	14.0	10	1.0	1.0	5	5	34	36
APR	112.9	3.76	4.9	7.2	14.1	15	1.0	1.0	5	5	42	48
MAY	160.4	5.17	7.0	9.8	9.2	5	.8	1.0	5	5	56	64
JUNE	166.3	5.54	7.6	10.5	9.6	5	.8	.8	3	5	68	75
JULY	208.4	6.72	10.2	12.8	10.7	5	.7	.8	< 5	< 5	76	76
AUG	214.0	6.90	9.0	11.7	7.8	7	.5	.6	< 5	< 5	74	74
SEPT	187.8	6.26	8.9	10.9	10.0	5	.5	.8	< 5	< 5	71	74
OCT	139.9	4.51	5.6	7.9	14.5	10	.5	.5	< 5	5	64	67
NOV	120.1	4.00	5.2	6.6	24.5	7	.5	.5	< 5	5	48	63
DEC	98.6	3.18	4.5	6.6	24.0	6	.5	.5	< 5	5	40	41
TOTAL	1696.3	-	-	-	-	-	-	-	-	-	-	-
AVG.		4.65	MAXIMUM 10.2	MAXIMUM 12.9	13.5	7	.7	MAXIMUM 1.3	< 5	MAXIMUM 5	53	MAXIMUM 76

CHLORINATION and DISINFECTION

MONTH	RAW WATER					PLANT EFFLUENT		DISTRIBUTION SYSTEM		CHLORINATION			
	NUMBER OF SAMPLES HAVING TOTAL COLIFORM ORGANISMS PER 100 ml OF					NUMBER OF SAMPLES TAKEN	NUMBER HAVING COLIFORM ORGANISMS	NUMBER OF SAMPLES TAKEN	NUMBER HAVING COLIFORM ORGANISMS	TOTAL AMOUNT OF CHLORINE USED pounds	DOSAGE		RESIDUAL IN PLANT EFFLUENT mg/l
	0	1 – 3	4 – 32	33 – 320	> 320						PRE – mg/l	POST – mg/l	
JAN	1	0	0	3	0	4	0	38	0	1.55	1.2	.5	.5
FEB	0	0	1	2	1	4	0	36	0	1.48	1.3	.5	.5
MAR	0	0	2	3	0	4	0	44	0	1.50	1.3	.5	.5
APR	1	0	3	0	0	4	0	36	0	1.79	1.2	.5	.5
MAY	1	0	1	2	0	4	0	40	0	3.31	1.6	.4	.5
JUNE	1	0	3	1	0	5	0	46	0	4.07	1.9	.8	.5
JULY	1	0	2	1	0	4	0	37	0	8.69	3.2	1.1	.5
AUG	2	0	3	0	0	5	0	50	1	8.74	3.4	.9	.5
SEPT	2	0	2	0	0	4	0	38	0	7.14	2.8	.9	.5
OCT	1	0	2	1	0	4	0	36	1	5.06	2.6	.9	.5
NOV	0	0	2	2	1	5	0	53	1	3.24	1.9	.6	.5
DEC	0	0	2	1	1	4	0	40	0	1.92	1.5	.5	.5
TOTAL	10	0	23	16	3	51	0	494	3	48.49			
AVG.	17 (NOTE – Average shown is the GEOMETRIC MEAN)									13 pounds per day	2.0	.7	.5

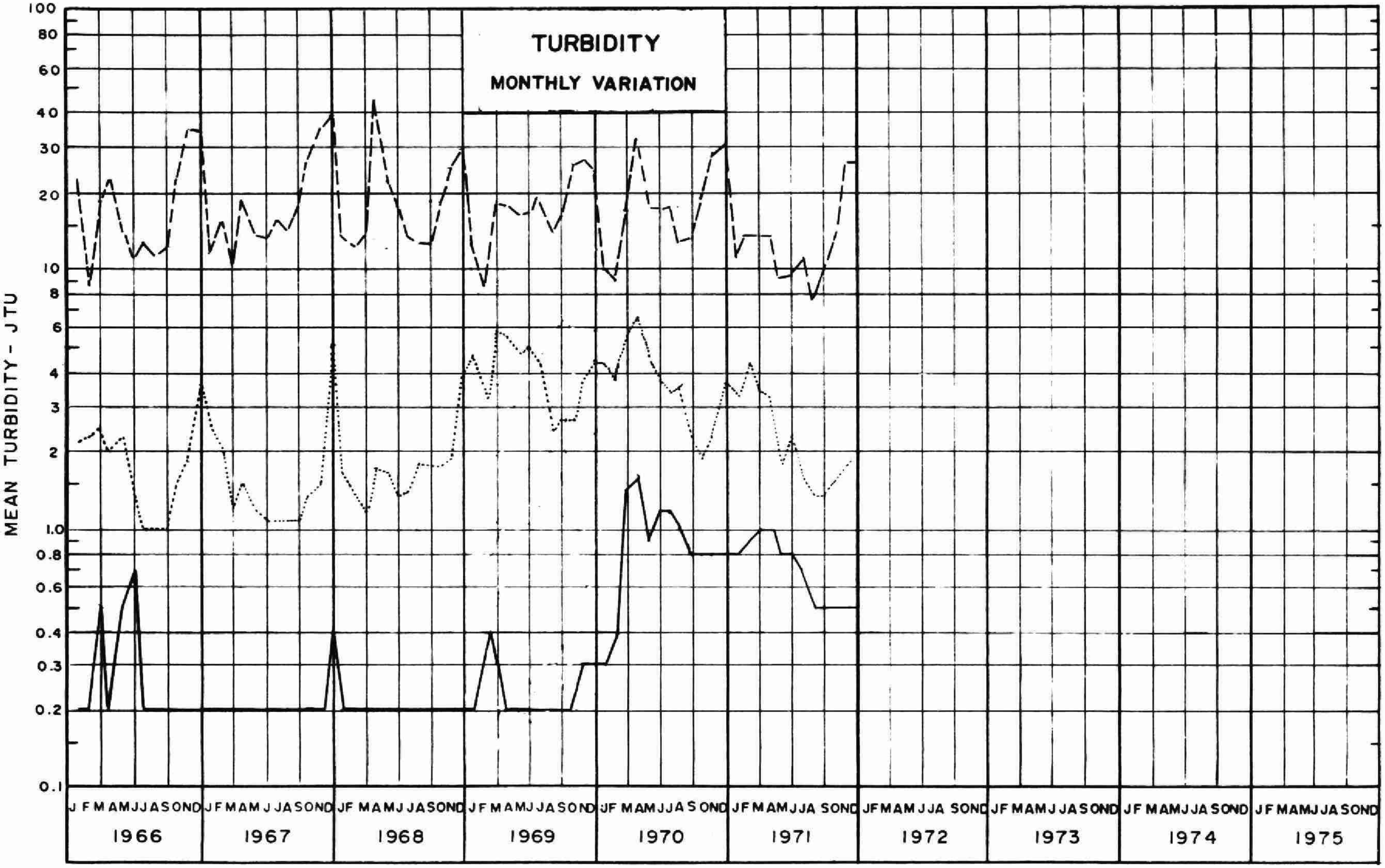
TREATMENT DATA

MONTH	+ ALUM		ACTIVATED CARBON		SODIUM SILICATE		SODIUM BICARBONATE	
	10^3 pounds	DOSE mg/l	pounds	DOSE mg/l	pounds	DOSE mg/l	pounds	DOSE mg/l
JAN	4.68	29	0	0	1.12	4.1	252	.9
FEB	3.98	29	0	0	1.24	4.0	280	.9
MAR	4.77	31	0	0	1.24	3.8	280	.9
APR	5.02	29	0	0	1.18	3.5	266	.8
MAY	6.58	27	400	3.7	1.67	3.4	378	.8
JUNE	7.01	27	400	3.2	1.48	3.1	336	.7
JULY	9.39	29	1400	4.0	2.00	2.7	462	.6
AUG	9.32	28	1350	3.5	1.67	2.7	378	.6
SEPT	8.52	29	1200	4.0	1.86	3.0	420	.7
OCT	6.16	29	1150	5.3	1.49	3.8	336	.8
NOV	5.42	29	0	0	1.67	4.4	378	1.0
DEC	4.52	31	0	0	1.49	6.5	336	1.4
TOTAL	75.37		5900		18.11		4096	
AVG.	.21	29	246	3.9	.16	3.7	37	.8

+ Alum Dosage as mg/l $Al_2(SO_4)_3 \cdot 14H_2O$
Liquid Alum taken as 48% $Al_2(SO_4)_3 \cdot 14H_2O$

TEMPERATURE AND ALGAE

MONTH	AVERAGE WATER TEMPERATURE degrees F	TOTAL ALGAE - in A.S.U. per 100 ml			
		RAW WATER	MICROSTRAINED WATER	CLARIFIED WATER	FILTERED WATER
JAN	34	2961	412	467	0
FEB	34	1656	882	901	0
MAR	34	4054	1966	647	0
APR	42	5705	2262	1362	27
MAY	56	3323	1552	0	0
JUNE	68	5360	1782	126	0
JULY	76	4269	2118	640	0
AUG	74	6051	5188	0	0
SEPT	71	8410	2817	2231	0
OCT	64	4821	1905	1253	0
NOV	48	4926	1691	3372	0
DEC	40	4671	1819	1872	0
TOTAL	-	-	-	-	-
AVG.	53	4803	2032	1287	27


TURBIDITY
MONTHLY VARIATION
MEAN TURBIDITY - JTU
100
80
60
40
30
20
10
8
6
4
3
2
1.0
0.8
0.6
0.4
0.3
0.2
0.1
J F M A M J J A S O N D
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975

WATER QUALITY

PROPERTY	RAW WATER				TREATED WATER				DESIRABLE STANDARDS
	NUMBER OF SAMPLES	AVERAGE	MAXIMUM	MINIMUM	NUMBER OF SAMPLES	AVERAGE	MAXIMUM	MINIMUM	
HARDNESS in mg/l as $CaCO_3$	24	120	130	102	29	116	132	104	80 – 100
ALKALINITY in mg/l as $CaCO_3$	24	83	88	80	29	78	76	60	30 – 100
IRON in mg/l Fe	24	.6	4.7	.05	29	.1	.15	.05	Less than 0.3
CHLORIDE in mg/l Cl^-	24	23	32	16	29	24	31	19	Less than 250
pH in pH units	24	8.0	8.2	7.8	29	7.4	7.9	7.0	7.0 – 8.5
FLUORIDE in mg/l F^-	19	.1	.2	.1	22	.1	.1	0	Less than 1.2
AMMONIA in mg/l as N	19	.02	.07	.01	18	.01	.03	.01	Less than 0.5
TOTAL KJELDAHL NITROGEN in mg/l as N	19	.37	.93	.20	19	.15	.20	.07	Less than 1.
NITRATE + NITRITE in mg/l as N	19	.24	.93	.01	18	.22	.62	.02	Less than 10
TOTAL PHOSPHORUS in mg/l as P	19	.06	.11	.03	18	.01	.23	.01	
SOLUBLE PHOSPHORUS in mg/l as P									
PHENOLS in $\mu g/l$ as C_6H_5OH									Less than 1

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